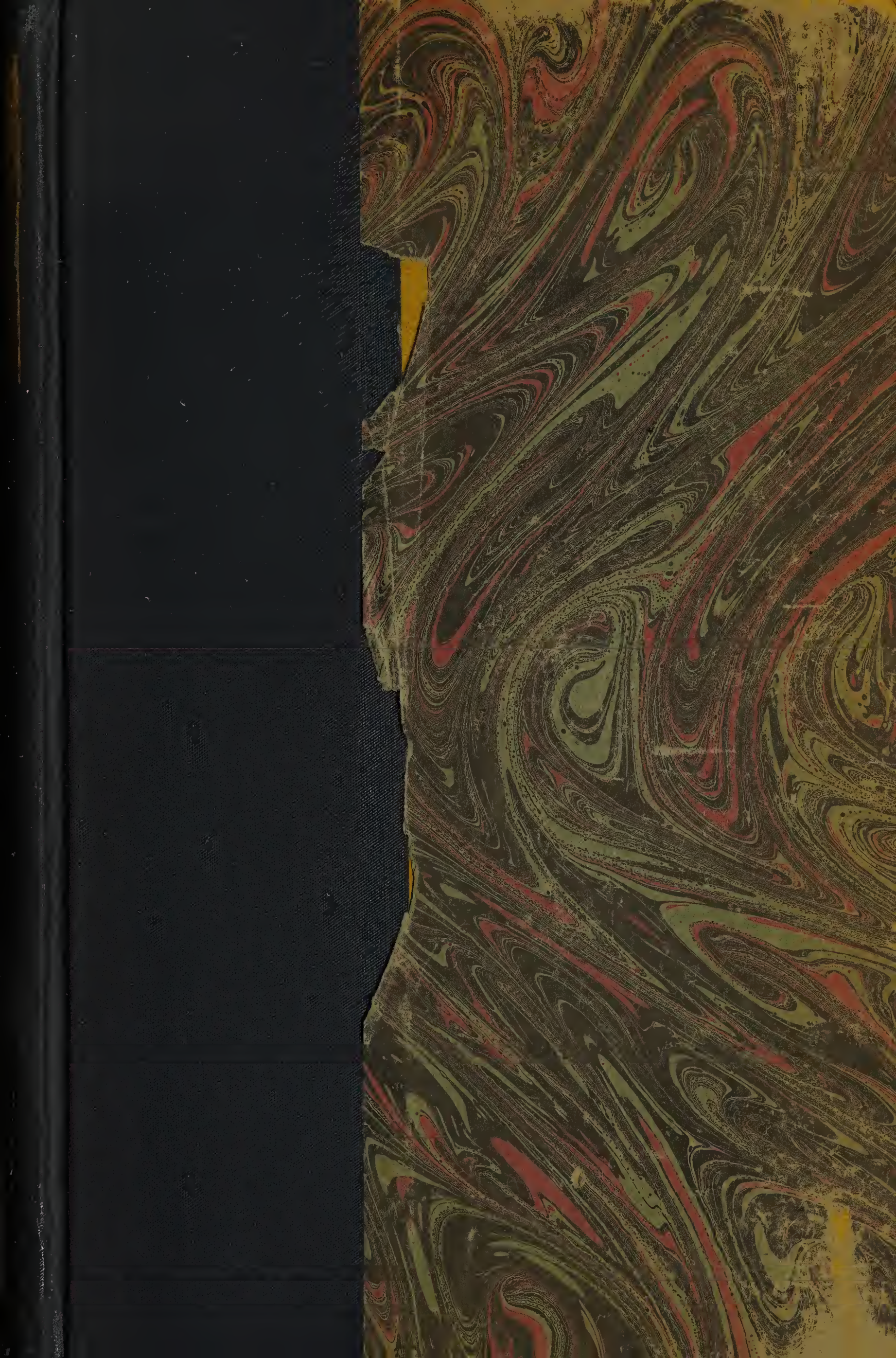




U. S. DEPARTMENT OF AGRICULTURE.

DIVISION OF MICROSCOPY.

12
6
R247
105
FOOD PRODUCTS.—II.

EIGHT EDIBLE AND TWELVE POISONOUS MUSHROOMS
OF THE UNITED STATES,

WITH

DIRECTIONS FOR THE CULTURE AND CULINARY PREPARATION
OF THE EDIBLE SPECIES.

BY

THOMAS TAYLOR, M. D.,
CHIEF OF THE DIVISION OF MICROSCOPY.

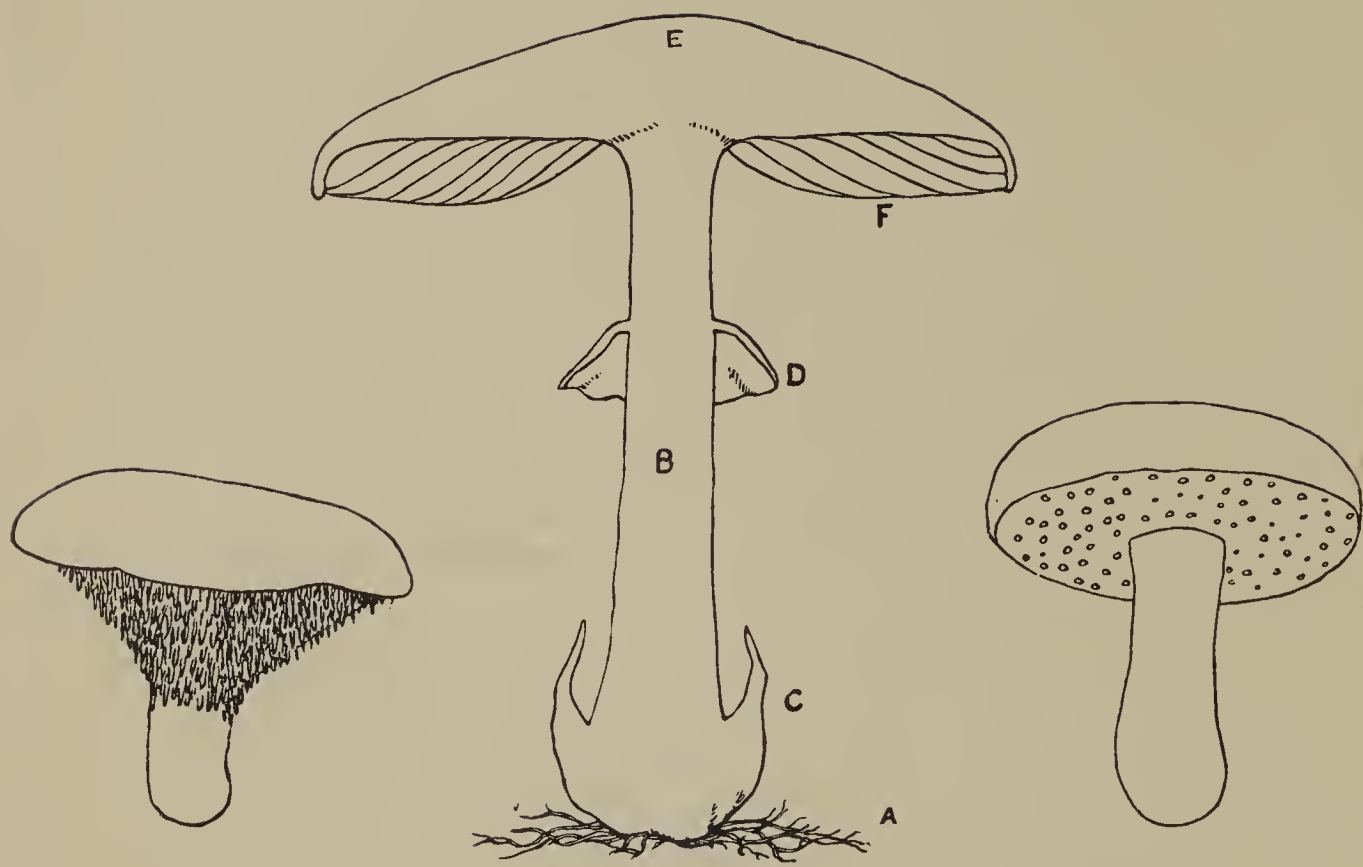
REPRINTED FROM THE REPORT OF THE SECRETARY OF AGRICULTURE FOR 1890.

SECOND REVISED EDITION.

WASHINGTON:

GOVERNMENT PRINTING OFFICE.

1893.



Hydnum.
Spine Mushroom.

Agaricus.
Gill Mushroom.

Boletus.
Pore Mushroom.

- A. Mycelium, or spawn.
- B. Stipe, or stem.
- C. Volva, or wrapper.
- D. Annulus, or ring.
- E. Pileus, or cap.
- F. Lamellæ, or gills.

U. S. DEPARTMENT OF AGRICULTURE.
DIVISION OF MICROSCOPY.

FOOD PRODUCTS.—II.

EIGHT EDIBLE AND TWELVE POISONOUS MUSHROOMS
OF THE UNITED STATES,

WITH

DIRECTIONS FOR THE CULTURE AND CULINARY PREPARATION
OF THE EDIBLE SPECIES.

BY

THOMAS TAYLOR, M. D.,
CHIEF OF THE DIVISION OF MICROSCOPY.

REPRINTED FROM THE REPORT OF THE SECRETARY OF AGRICULTURE FOR 1890.

SECOND REVISED EDITION.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1893.

INTRODUCTORY NOTE.

U. S. DEPARTMENT OF AGRICULTURE,
DIVISION OF MICROSCOPY,
Washington, D. C., September 22, 1893.

SIR: The paper presented herewith, which formed part of my report for the year 1890, was reprinted in 1891, becoming No. 2 in the series of reports issued from this division under the general title of Food Products. As the first edition of this report is now exhausted and the popular demand for information relative to the culture and use of mushrooms still continues, the printing of a second edition is respectfully requested.

Very respectfully,

THOMAS TAYLOR,
Microscopist.

HON. J. STERLING MORTON,
Secretary of Agriculture.

CONTENTS.

Eight edible and twelve poisonous mushrooms of the United States.....	Page. 5
Cautionary suggestions	5
Eight edible mushrooms of the United States (Pl. 1).....	6
Twelve poisonous mushrooms (Pl. 2)	7
Mushroom culture (Pls. 3-5).....	8
Artificial mushroom spawn	10
Value of mushrooms as a food product	14
Distinguishing the edible species.....	15
Preserving and cooking mushrooms	16
Recipes.....	17
Cultivation of mushrooms in Japan	19
Edible mushrooms of the United States	21

EIGHT EDIBLE AND TWELVE POISONOUS MUSHROOMS OF THE UNITED STATES.

The following paper was prepared with a view to supplement my first report on edible mushrooms of the United States, which appeared originally in the annual report of this Department for the year 1885, and has since been reprinted as the first number in the series of bulletins on food products. The present report contains descriptions and illustrations of eight additional species of edible mushrooms common in the United States, together with an account of simple and improved methods of mushroom culture, and certain recipes for preparing mushrooms for the table which may be found useful in localities where as yet this savory, nutritious, and abundant article of food has not been utilized. Twelve of the poisonous varieties are also illustrated and their distinguishing characteristics described.

CAUTIONARY SUGGESTIONS.

Before collecting for the table mushrooms found growing in the woods or fields, it will be well for inexperienced persons to consult carefully some work on the subject in which the characteristics of edible and poisonous varieties are described and illustrated. The taste and odor of a mushroom are quite significant, and colors also should be carefully observed. All mushrooms found growing in filthy places should be rejected, and those which yield a white milk when the gills are bruised should also be avoided, as they are generally poisonous.

The common puff-ball, for table use, should have a white flesh, a firm texture, and should be free from insects. The small warty puff-ball has a bad odor and is not used.

There is a yellow mushroom known to botanists as *Lactarius deliciosus* which is edible and yields an orange milk when bruised. It is a bright golden yellow, having an odor that has been compared to that of apricots, and is found plentifully in some of the States, though practically unknown to the public. For a further description of it, see Plate 1, Fig 1, in my first paper on this subject, "Food Products—I: Twelve Edible Mushrooms of the United States."

A class of mushrooms known as *Boleti* supplies many edible species. Select none for table use but such as are found growing or in a fresh

condition. In the edible varieties the flesh remains white when broken, but of those which turn quickly a deep blue some are poisonous. According to some writers, several of the species which turn blue are edible. My advice is, discard all Boleti, the flesh of which turns blue on exposure to the air, until we have more reliable data upon this subject. The Boleti have pores instead of gills. Edible Boleti have generally a shaded brown top; the pores underneath may be first whitish, then green or yellow. For culinary purposes remove the spore tubes and stalks. The outer skin of the top is peeled off, when they may be dried on strings, like cut apples, and kept for use. Although this class is not generally regarded as edible in the United States, "it is sold commonly in all stores where beans, barley, and such food substances are kept on sale in Germany." (Cooke.)

EIGHT EDIBLE MUSHROOMS OF THE UNITED STATES.

[Description of Plate 1.]

FIG. 1. The "*Plum*" mushroom (*Agaricus prunulus*).—Of this species Worthington G. Smith gives the following description: "The pure pink gills running considerably down the ringless stem, and the fresh, fragrant smell of meal, at once distinguish this species from all others. The solid stem and very fleshy top are white or some shade of very pale gray. The flesh is firm, juicy, and full of flavor, and broiled or stewed it is a most delicious morsel." It grows in and near damp woods. Its top will measure from $1\frac{1}{2}$ to 6 inches across.

FIG. 2. The "*Variable*" mushroom (*Russula heterophylla*).—This species is known by its sweet, nutty taste, and is very common in the woods. Its gills are white and sometimes branched; flesh, white; stem, solid, white, and ringless; top, firm, variable in color, as its name indicates; the thin, viscid covering of the pileus is commonly subdued green, but at one time approaches greenish yellow or lilac, and at another, gray or obscure purple. The top is at first convex, becoming concave; it is excellent baked with salt, pepper, and butter, between two dishes.

FIG. 3. The "*Scaly*" mushroom or *Parasol agaric* (*Agaricus procerus*).—This is by some thought superior to the "Common" or "Meadow" mushroom. Robinson says: "Whenever an agaric on a long stalk enlarged at the base presents a dry cuticle more or less scaly, a darker colored umbonated top, movable ring, and white gills, it must be *Agaricus procerus*, the Parasol agaric, and it may be gathered and eaten without fear. When the whitish flesh is bruised it shows a light reddish color." It grows in pastures and woods and is known by its long, bulbous, spotted stem, by the ring that will slip up and down, by the very scaly top, and the gills far removed from the stalk at its insertion. Diameter of top 5 to 8 inches.

FIG. 4. The "*Honey-colored*" mushroom (*Armillaria mellea*).—This very common species is not highly esteemed in some countries where other and better sorts can be had. Pileus, fleshy; color, pale rufus, more or less shaded with yellow. It grows in tufts on old stumps. Stem, elastic; gills, pallid, and running down the stem. This is a most desirable mushroom, when young, cap about an inch and a half in diameter.

FIG. 5. *Lepiota cepastipes*, var. *cretaceus*.—This very delicate and beautiful agaric is found on tan and leaves in hothouses. The specimens here delineated I found in one of the hothouses of the Department gardens. Its color is very pure white throughout. Both stem and pileus are covered, as seen in the drawing, with small chalky tufts. "This species," says Berkeley, "is probably of exotic origin, as it never grows in the open air." It is met with in the hothouses of Europe. (Peck.)



EIGHT EDIBLE MUSHROOMS COMMON TO THE UNITED STATES.

SECOND SERIES.



W. H. H. & Co.

Steuben Lith Co. Albany, N.Y.

TWELVE POISONOUS MUSHROOMS.

FIG. 6. *The "Horse" mushroom (Agaricus arvensis).*—This species, found in fields and pastures in the autumn, is, when young and fresh, most desirable eating. The top in good specimens is snowy white; gills, pinkish, turning to brown, ultimately becoming brownish black. It has a big ragged, floccose ring and pithy stem inclined to be hollow. As soon as broken or bruised this mushroom turns a brownish yellow. Its flesh is firm and delicious, and yields an abundant gravy.

FIG. 7. *Cortinarius caeruleus.*—Pileus, fleshy, a very beautiful blue color; gills a pure blue; stem, also blue with margined bulb. A cobweb-like filament frequently extends from the base of the stem to the margin of the pileus. Skin is viscid when moist. Grows on stumps.

FIG. 8. *The "Oyster" mushroom (Agaricus ostreatus).*—Found on dead tree trunks in the autumn. Top, cinereous in color; gills, white; stem, eccentric or altogether wanting. It usually grows in masses one above another. Worthington G. Smith says of this species: "A dish of them stewed before a very hot fire has proved as enjoyable and nourishing as half a pound of fresh meat." *A. ostreatus* may be dressed in any of the usual ways, but is better cooked over a slow fire.

TWELVE POISONOUS MUSHROOMS.

[Description of Plate 2.]

FIG. 1. *The "Red Juice" mushroom (Hygrophorus conicus).*—This species is common in pastures and roadsides. It has a strong and unpleasant odor; flesh, juicy; color of the top, crimson or a deep orange; taste, bitter; stem, hollow. It is found in groups on old tree stumps.

FIG. 2. *The "Emetic" mushroom (Russula emetica).*—This dangerous species has a bright scarlet or rose-colored top, sometimes shaded with purple. The skin is readily peeled off, exposing the flesh, which is white. It is very acrid to the taste. Gills, white; stem, white, sometimes pinkish; length about $2\frac{1}{2}$ inches.

FIG. 3. *The "Verdigris" mushroom (Agaricus aeruginosus).*—Pileus, fleshy; convexo-plane, covered with green mucus; stem, long, hollow, and scaly, tinged with blue; gills, brown, tinged with purple. This mushroom quickly decays. Top is about 3 inches across.

FIG. 4. *The "Satanical" tube mushroom (Boletus satanas).*—By far the most splendid of all the Boleti. Top, nearly white, very fleshy, and a little viscid. Stem, firm, exquisitely reticulated. The under surface of the pileus is bright crimson. When bruised or broken the inner fleshy substance becomes a deep blue. As its name indicates, this belongs to the class of tube or pore-bearing fungi. The pores are upon the under surface of the pileus and take the place of the gills or lamellæ of the Agaricini group.

FIG. 5. *The "Trellised" clathrus (Clathrus cancellatus).*—This is a poisonous mushroom of great beauty and variety. The fætor exhaled from it is most repulsive. In the young plant, however, the bad odor is not so strong, or may be altogether wanting.

FIG. 6. *The "Spring" mushroom (Agaricus (Amanita) vernus).*—This agaric is found in the woods in the spring, and is white in all its parts. It is supposed to be very poisonous.

FIG. 7. *The "Fiery" tube mushroom (Boletus piperatus).*—One of the smaller Boleti. Taste, highly acrid; grows in woods; it is probably dangerous; never attains a large size.

FIG. 8. *The "Fly" mushroom (Agaricus (Amanita) muscarius).*—This species, allied to the perfectly wholesome red-fleshed mushroom, *Amanita rubescens*, is a bright yellow just beneath the skin; the rest is white. It is usually a bright scarlet on top, sometimes a deep yellow or orange. Few species can exceed it in beauty. It grows in some places in such profusion as to make the very ground scarlet. Found in birch and pine woods.

FIG. 9. The “Ruddy-milk” mushroom (*Lactarius rufus*).—Pileus fleshy, umbonate, at length funnel-shaped, dry, zoneless, dark rufous; stem stuffed, rufous; gills crowded, ochreous, and rufous. On bruising the gills a white milk exudes which is extremely acrid and corrosive, a distinguishing mark.

FIG. 10. The “Fiery milk” mushroom (*Lactarius piperatus*).—So called from the powerfully acrid milk which it contains, white and abundant. When the milk is placed on the lips or tongue it produces the sensation of scalding or searing with a hot iron. Color white, inclining to cream; flesh firm and solid. Found in dry wood. Recently considered by some authors harmless when properly cooked, it losing thus its acrid character.

FIG. 11. The “Bitter” tube mushroom (*Boletus felleus*).—This mushroom is rare. Pileus is soft, smooth, brown, inclining to reddish gray; stem solid above, attenuated, reticulated; tubes or pores angular, flesh color, as well as the fleshy substance of the pileus when broken. The flesh is very bitter.

FIG. 12. Fetid “Wood-Witch” (*Phallus impudicus*).—If this species had not been eaten, it would hardly be necessary to refer to it. It is offensive and dangerous.

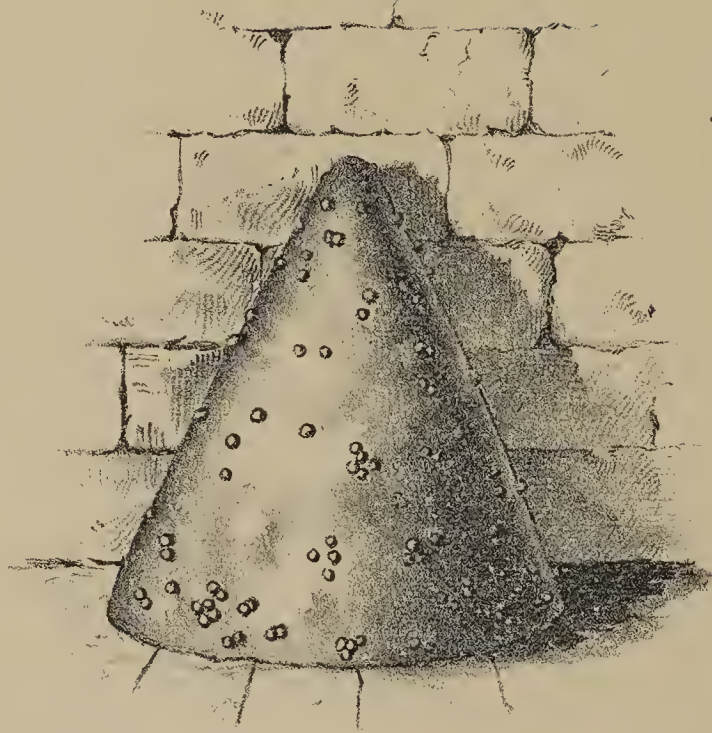
MUSHROOM CULTURE.

In the first attempts to raise mushrooms artificially, young living mushrooms were transferred from pastures to gardens and manure heaps, and fullgrown mushrooms were broken up, the fragments steeped in water, and the infusion applied to a bed thought to be suitable.

Mushrooms were first grown from spawn in the seventeenth century. At that time gardeners and nurserymen sought in pastures for the supposed true spawn. The first successful attempts at mushroom-growing from such spawn were made by introducing it into melon and cucumber beds at the time the melon seeds were sown. At the present day “virgin spawn” is obtained from old rich pastures where horses and oxen have been feeding. This spawn is made up with partially dried cakes of compacted horse and cow dung and earth. If the cakes are too wet or too dry the spawn will not run; it runs best and with greatest vigor in a moist heat of from 70° to 75° F. Cocoa-fiber waste is a good ingredient in mushroom beds; the spawn freely runs in it. In the prepared cakes the spawn, if good, will generally live in a resting state for five years. It has been known to live for twenty years. In France it is usual to apply niter (saltpeter) in weak solutions to mushroom beds for the purpose of increasing the size of the mushroom. In 1879 M. Charollois exhibited at the Central Horticultural Society of Paris a basket of mushrooms produced from spawn by sowing the spores on a plate of glass kept constantly moist and sprinkled with dung; the spawn thus produced was transferred to a mushroom bed. (See “Sowerby’s Models of British Fungi.”)

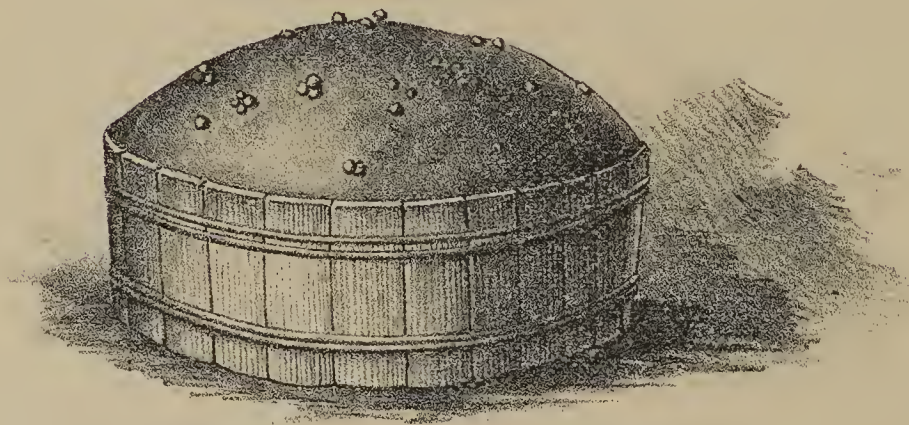
Dr. Gautier relates that the late distinguished chemist, M. Chevreul, a member of the French Academy of Sciences, after he had attained the age of 90, exhibited at the Academy of Sciences a few magnificent looking mushrooms that he had produced by causing the spores to germinate on a pane of glass covered with damp sand; afterwards selecting the most vigorous plants and sowing or planting their myce-

FIG 1.



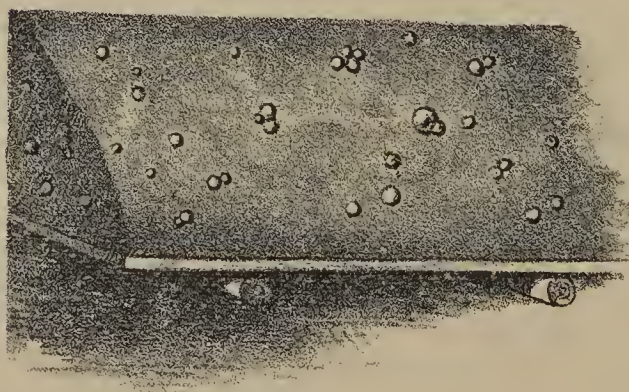
PYRAMIDAL MUSHROOM BED ON FLOOR OF CELLAR.

FIG 2.



MUSHROOMS GROWN IN BOTTOM OF OLD CASK.

FIG 3.



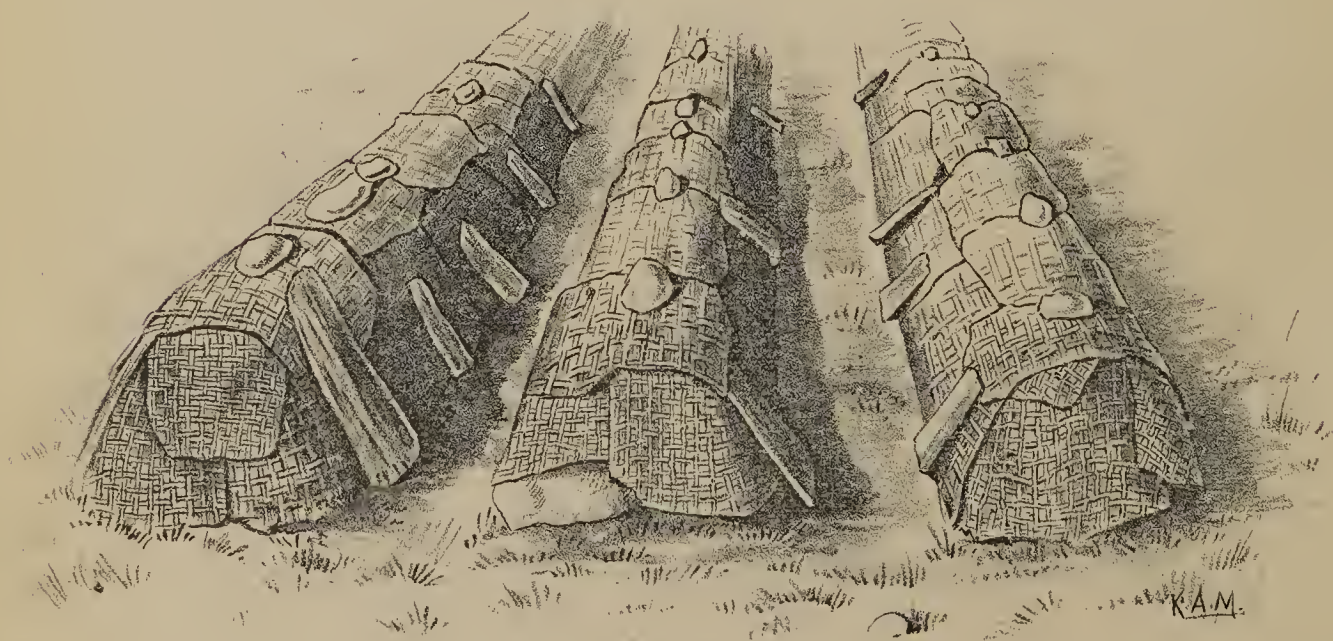
MUSHROOM BED ON RUDE SHELF AGAINST WALL OF CELLAR.

FIG. 4.



UNCOVERED END OF MUSHROOM-BED IN PARIS MARKET-GARDEN.

FIG. 5.



MUSHROOM-BEDS IN MARKET-GARDENS, KENSINGTON, ENGLAND.

lium in the damp soil of a cave, consisting of a richly manured mold covered with a layer of sand 2 inches deep, then with another layer of gravel, or the débris of a building, to the depth of about an inch. This bed was watered with a weak solution of nitrate of potash and at the end of a few days the mushrooms had attained an enormous size.

The French often cultivate mushrooms in cellars as well as in caves. The cellar should be warm and dry, as dark as possible, and free from drafts. Only two species thus far have been successfully cultivated, viz., *Agaricus campestris*, and an allied species, *A. arvensis*. Plates 3, 4, and 5 illustrate several modes of cultivation.

FIG. 1, PLATE 3, represents a pyramidal-shaped mushroom bed made on the floor of the cellar, which should be at least 2 feet 6 inches in diameter. They are built in the shape of an old-fashioned sugar-loaf, about 3 feet in height; the pieces of spawn placed $1\frac{1}{4}$ inches deep and 16 inches apart.

FIG. 2, PLATE 3, represents mushroom culture in barrels sawed into two pieces crosswise, each forming a tub. Holes are made in the bottom of each tub and a thin layer of good soil is spread over them inside. They are then filled with good, well-prepared stable manure, as in the case of ordinary mushroom beds. When the tub is nearly full of material, well pressed down, six or seven good pieces of spawn are placed on the surface and the remainder of the tub is covered with two inches of garden mold and placed in a warm cellar.

FIG. 3, PLATE 3, shows a mushroom bed upon a shelf in a stable. Strong bars of iron are driven into the walls, upon which are placed shelves of the proper size covered with earth, upon which is formed a bed that is treated exactly as those made upon the ground. These beds are just as productive as any other kinds.

Mushrooms may be grown in all kinds of greenhouses, "stoves," pits, and frames. Some of the best crops, according to Robinson, have been raised in cold greenhouses, almost too ruinous to grow anything else. Mushrooms may be grown in the open air in gardens. The Paris growers never attempt their culture in summer, the summer insects being very destructive to mushrooms. The London gardeners very rarely do so. It is in winter that their cultivation is carried on in full vigor in the open air. Abundant crops are grown in the open air by the market gardeners of London and Paris. From their beds mushrooms are gathered in quantities in midwinter as well as in autumn.

FIG. 4, PLATE 4, represents the uncovered end of a mushroom bed in a Paris market garden. The horse manure is collected for a month or six weeks before the beds are made. All rubbish, chips, etc., are carefully taken out and the heaps are raised generally 2 feet thick and pressed down with the fork. When this is done the bed is well stamped and, if very dry, slightly watered with a rose. It is left in this state for eight or ten days, by which time it has begun to ferment, after which the bed should be well turned over and re-made on the same place, placing the manure that was at the sides in the center of the heap on turning and re-making. The mass is then left ten days more, at the end of which time the manure is about in proper condition for making the beds that are to bear the mushrooms. Little ridge-shaped beds about 26 inches wide and the same in height are then formed in parallel lines at a distance of 20 inches apart and of any desired length. (See Fig. 5, Pl. 4.) The beds once made of a firm close-fitting texture, the manure soon begins to warm again, but does not become unduly hot for the spread of the spawn. The spawn is inserted generally within a few inches of the base, about

13 inches apart, it having been ascertained beforehand that the heat is genial and suitable. The pieces of spawn used are about the size of three fingers and the manure is closed over and pressed firmly around them. This done, the beds are covered with about 2 inches of rich mold. If, after the lapse of ten or twelve days, the white filaments are seen spreading in the bed the cultivator knows that the spawn is good; if not, the spawn is rotting and must be removed and replaced with better. When the spawn is seen spreading well through the beds, the bed should be covered with fresh, sweet, rich soil of the garden and applied equally and firmly with a shovel to the depth of about an inch or so. A covering of abundance of litter or old mats is put on after the beds are earthed and kept in place by means of tiles, bricks, old boards, or any such materials for protection. The beds will soon be in full bearing, and it is thought better to examine and gather from them every second day or even every day if there are many beds. Occasional watering in a dry season is necessary. The beds are spawned at a temperature of about 80° F.

FIGS. 6 and 7, PLATE 5, represent a mushroom house and sections designed with a view to growing mushrooms during the greater part of the year without the aid of artificial heat. It is constructed, as will be seen, in such a way as not to be affected by changes of the external temperature. The walls are hollow and banked round with the soil excavated from the interior. The roof is thatched with reeds and the ends are of studwork, lined inside with boards and outside with split larch poles, the cavity to be filled with sawdust or cut straw; a small diamond-shaped ventilator, hung on pivots, should be fixed in each end. The floor may be of concrete or burnt clay, well rammed, and the beds are retained in their places by boards nailed to good oak posts. Care should be taken to provide efficient drains so that no stagnant damp may exist about the building.

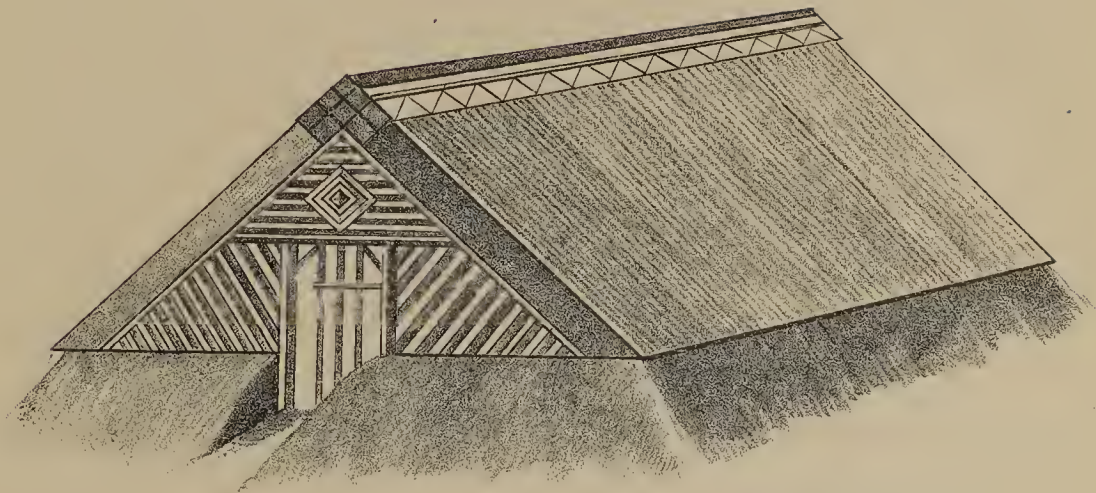
As the Department of Agriculture has had frequent inquiries as to mushroom spawn and how and where to obtain it, the following, taken from "Robinson on Mushroom Culture," is inserted for the benefit of those whom it may concern:

Generally the spawn is supposed to be analogous to *seed*. It is really what may be termed the vegetation of the plant, or something analogous to roots, stems, and leaves of ordinary plants, the stem, head, and gills of the mushroom being in fact the fructification. Spawn is found in a natural state in half decomposed manure heaps, in places where horse droppings have accumulated and been kept dry, and rarely or never in very moist or saturated materials. This natural spawn is the best, and should be used wherever it can be found. Divide the white spawn into pieces a few inches square, and an inch or more thick. They will, of course break up irregularly, but all should be used, whether of the size of a bean or nearly that of the open hand. In most places where horses are kept, opportunities occur of finding this spawn. Its white filamentous and downy threads have the odor of mushrooms and the spawn is therefore very easily recognized. It need not be used when found, but may be dried and kept in a dry place for years. It has been known to keep as long as fourteen years. To preserve spawn found in a natural state nothing more is required than to take up carefully the parts of the manure in which it is found, not breaking them up more than may be necessary, and placing the pieces of all sizes loosely in rough shallow hampers. Place these in some airy loft or shed till thoroughly dry, and afterwards pack in rough boxes till wanted for use.

ARTIFICIAL MUSHROOM SPAWN.

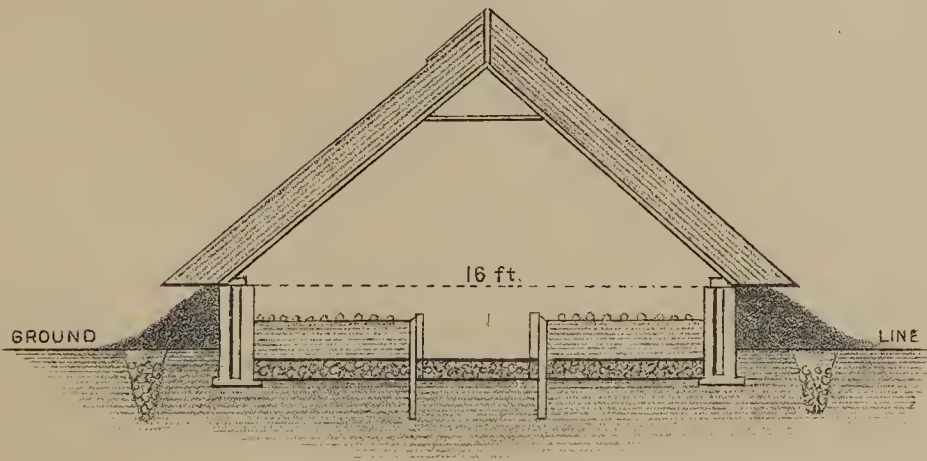
This spawn is made from horse droppings and some cow dung and road scrapings beaten up into a mortar-like consistency in a shed and then formed into bricks slightly differing in shape with different makers,

FIG. 6.



VIEW OF UNHEATED MUSHROOM - HOUSE .

FIG. 7.



SECTION OF PRECEDING FIGURE.

but usually thinner and wider than common building bricks. The following proportions are about the best: (1) Horse droppings the chief part; one-fourth cow dung; remainder loam. (2) Fresh horse droppings mixed with short litter for the greater part; cow dung one-third; and the rest mold or loam. (3) Horse dung, cow dung, and loam, in equal parts. These bricks are placed in some airy, dry place and when half dry a little bit of spawn about as big as a hazelnut is placed in the center of each, or sometimes when the bricks are as wide as long, a particle is put near each corner, inserted just below the surface and plastered over with the material of the brick. When nearly dry the bricks are placed in a hotbed about a foot thick in a shed or dry place. The bricks are piled openly and loosely and covered with litter so that the heat may circulate evenly among them, not above 60° F. If the temperature should exceed this it may be reduced by removing the covering of the litter. The bricks are frequently examined during the process, and when the spawn has spread throughout the brick like a fine white mold it is removed and allowed to dry for future use, in a dark place. If allowed to go further than the fine white-mold stage and to form threads and tubercles in the bricks it has attained a higher degree of development than is consistent with preserving its vegetative powers.

French mushroom spawn differs from our own in not being in the form of bricks or solid lumps but in rather light masses of scarcely half decomposed, comparatively loose, dry litter. This spawn is obtained by preparing a little bed as if for mushrooms in the ordinary way and spawning it with morsels of virgin spawn if obtainable. When the spawn has spread through it the bed is broken up and used for spawning beds in the caves or dried and preserved for sale. It is sold in small boxes, and is fit for insertion when pulled in rather thin pieces about half the size of the open hand. In separating it, it divides into many small pieces, every particle of which should be used. The small particles should be strewn broadcast over the bed after the larger pieces have been inserted. There is no necessity for purchasing artificial spawn at all where mushrooms are regularly grown; nor is there in any case, except at the commencement or to guard against one's own spawning proving bad. To secure good spawn we have only to do as the French growers do, take a portion of a bed where it is thoroughly permeated by the spawn, and before it begins to bear, and preserve it for future use.

What practical mushroom-growers call spawn, botanists term mycelium. Keeping the spawn dry merely suspends its growth; as soon as it is again submitted to favorable conditions of moisture and heat its pristine activity returns. The brick spawn is commonly known as English spawn, and what is imported into this country is made in England, mostly about London.

"Mill-track" spawn used to be considered the best in England, but it has been superseded, although European gardeners still call for the

English spawn under the name of "mill track." The real "mill track" is the natural spawn that has spread through the thoroughly amalgamated horse droppings in mill tracks or the cleanings from mill tracks. It is usually sold in large, irregular, somewhat soft lumps, and is much esteemed by spawn-makers for their "bricks." But nowadays, that horses have given place to steam as a motive power in mills, we have no further supply of "mill-track" spawn for use in spawning our mushroom beds. The "flake" spawn is what is generally known as the French spawn, and is imported into this country from France. It is put up in two ways, namely, nicely packed in wooden boxes, each containing 2 or 3 pounds of spawn; and also loose in bulk, when it is sold by weight or measure.

"Virgin" spawn is what we call natural spawn or wild spawn; that is, the spawn that occurs naturally in the fields, in manure piles or elsewhere and without any artificial aid. Virgin spawn is supposed to be produced directly from the mushroom spores and is not a new growth of surviving parts of old spawn that may have lived over in the ground. It is far more vigorous than "made" spawn, and spawn-makers always endeavor to get it to use in spawning the artificial spawn. It is not easy to obtain. Now and again we come upon a lot of it in a manure pile; it looks like a mass of netted white strings traversing the manure. As soon as discovered, secure all you can find, bring it indoors to a loft or shed or room and spread it out to dry; after drying thoroughly keep it dry and preserve and use it as you would French spawn, for it is the best kind of "flake" spawn. Spawn should be kept in a dry, airy place, somewhat dark if convenient, and in a temperature between 35° and 65° F. If the spawn is perfectly dry and kept in a dry, airy place, and not in large bulk and covered, it will bear a high temperature with apparent impunity, but whenever dampness, even of the atmosphere, is coupled with heat the mycelium begins to grow and this in the storeroom is ruinous to the spawn. My experience is, that frost destroys the vitality of both "brick" and "flake" spawn. How long spawn may be kept without impairing its vitality is an unsettled question, but there is no doubt that if properly kept it will remain good for several years. Do not use any old spawn. It is three months from the time the manure is gathered for the beds, until the mushrooms are harvested. Can any one afford to court failure in an enterprise which takes so much time and is attended with so much care and expense by using old spawn? If we could positively tell good from bad spawn we would never use bad spawn and therefore with ordinary care would have very few failures in mushroom growing, for good spawn is the root of success in this business. Spawn differs very much in its appearance; sometimes the "bricks" show very little evidence of the presence of spawn and still are perfectly good; again, we may get "bricks" that are pretty well interlaced and clouded with bluish white mold or fine threads, and this, too, is good; when the

“bricks” are freely pervaded with pronounced white threads this is no sign that the spawn is bad; “bricks” dried as hard as a board may be perfectly good; so, too, may be those that are comparatively soft. Mushroom spawn should have a decided smell of mushrooms and, whatever cobweb-like mold may be apparent, should be of a fresh bluish white and the fine threads a clear white. Prominent yellowish threads or veins are a sign that the mycelium started to grow and was killed. Distinct white mold patches on the surface of the “bricks” indicate the presence of some other fungus parasitic on the mushroom mycelium; the absence of any mushroom smell in the spawn indicates its worthlessness, and that the mycelium is dead. One familiar with mushroom spawn can tell with considerable certainty “very living” spawn from “very dead” spawn, but I am far from convinced that any one can decide unhesitatingly in the case of “middling” or “weak” spawn. M. Lachaune says that good spawn shows an abundance of bluish-white filaments well fitted together and giving off a strongly marked odor of mushrooms. All those portions which show traces of white or yellow mold or have a floury appearance should be rejected and destroyed. Mr. Wright says a brick may be a mass of moldiness and yet be quite worthless; and if the mold has a spotted appearance, as if fine white sand had been dredged on and through the mass, it is certain there is no mushroom-growing power there. If thick threads pass through the mass and there are signs of miniature tubercles on them, then the spawn may be regarded as too far gone. Clusters of white specks on the spawn denote sterility. As two lots hardly ever come exactly alike, it is hardly possible to give precise rules to follow excepting the never-failing requisite which the spawn must possess to be good, namely, the moldy appearance on the surface, the more the better, without showing threads. Too many of these to a given space are a sure indication of exhausted vitality arising generally from the bricks being heaped together when in process of manufacture before they are sufficiently dried. Healthy bricks are usually of a dusty brown color and light of weight. Black-colored spawn is to be avoided as a rule and when the black appearance is very prevalent in a cargo of “bricks” it is a strong indication that the spawn has not run its course, and as it is not expected to do so after it has reached the hands of the retailer, it is economy to cast it aside. It is not necessary to break a “brick” apart to see how it looks inside, nor even necessary to lay hands on it. The outward moldy appearance is the best of all evidence of its healthy vitality and this never exists in “bricks” that have lost their germinating power, excepting, of course, where they have been kept damp and the spawn has spent its power, which is detected by white threads appearing in great quantity. (Letter of A. D. Cowan, of New York, in Mr. Falconer’s book, page 85.)

For further excellent advice as to making “brick” spawn, “flake” spawn, and the French “virgin” spawn, see the excellent treatise on

the subject of mushroom cultivation published by Mr. Falconer in 1891 and for sale by the Orange Judd Publishing Company, New York.

The "flake" or French spawn costs about three times as much as the "brick" or English spawn, and as it is so much whiter with mycelium than is the "brick" spawn, many believe that it is more potent and well worth the additional cost. "In spawning the beds," says Mr. Falconer, "I use two pounds of 'flake' spawn to plant the same space for which I would use five pounds of 'brick' spawn, and this gives a capital crop, with the number of mushrooms a little in favor of 'flake' spawn; but on account of the larger size of the mushrooms the weight of the crop is considerably in favor of the 'brick' spawn. I also find more certainty of a crop in the case of the 'brick' spawn than in the other." Mr. John F. Barter, of Lancefield street, London, one of the most successful mushroom-growers and spawn-makers in Great Britain, who makes his living by it, in response to my inquiry, writes: "I have tried them both, and know 'brick' spawn to be far the better. Generally the French spawn produces one-third fewer mushrooms than does the 'brick' spawn from the same length of bed, and besides, those from the 'brick' spawn are by far the heavier and fleshier."

Mr. Falconer observes further that it is odd, but true, that the "flake" spawn does not produce as good results in outdoor beds as it does in those under cover.

VALUE OF MUSHROOMS AS A FOOD PRODUCT.

In Russia, Germany, Italy, and the south of France, mushrooms furnish the peasantry and frequently the working classes in the cities a food which in their case takes in part the place of meat, of which they are too often deprived.

According to Schlossberger and Depping, in 100 grams of dried mushrooms they found the following proportions of nitrogenous substances:

Varieties.	Grains.
Chanterelles	3.22
Certain Russulas	4.25
Lactarius deliciosus.....	4.68
Boletus edulis.....	4.25
Meadow mushroom.....	7.26

But all chemists are not agreed as to these proportions. For instance, Lefort has found 3.51 grains of nitrogenous matter in the cap of *Agaricus campestris*, 2.1 grains in the gills and only 0.34 of a grain in the stem. Payen has found 4.68 grains in *Agaricus campestris*, 4.4 grains in the common Morelle (*Morchella esculenta*), 9.96 grains in the white truffle, and 8.76 grains in the black.

The use of mushrooms exclusively for food is perfectly compatible with the preservation of excellent health, it is said. A number of

investigators have experimented in this line, nourishing themselves exclusively for weeks and months upon mushrooms and, it is said, have never enjoyed better health. A mountaineer of Thuringia, according to a legend of the foreign mycologists, lived upon mushrooms and nothing else for thirty years and died a centenarian (Dr. Gautier).

The same writer relates that a proprietor at Montagne, France, had from a cave, each day, an abundant crop of mushrooms, sometimes sending to market more than 400 pounds of them. There are in this cave between six and seven miles of mushrooms, and this proprietor is but one of a number of manufacturers devoted to this species of horticulture. The temperature of these caves is so equable that mushrooms may be cultivated in them the year round. Their best crops are said to be in winter. "But these great manufacturers have not a monopoly of the cultivation of the meadow mushroom. Each of our readers may very easily procure a mushroom bed at very little expense and amply sufficient for the domestic use of his household. In order to maintain the fruitfulness of the bed it is well to water it with the water in which the mushrooms for the table have been pared and washed, and also to allow a few plants to wither on the stem, as these at maturity will scatter their spores around them. When the bed is exhausted fresh manure should be added. Spring and summer are the best seasons for constructing the beds. They are usually in full bearing at the end of one or two months."

In Geneva a very lucrative trade is carried on in the exportation of the edible *Boletus*, which is preserved for use in various ways, the simplest of which consists in cutting the caps in slices and stringing them, after which they are placed on hurdles in the shade to dry. They may also be dried in a stove or oven but the former method is preferable, as the mushroom then retains more of its flavor or perfume. When the slices are perfectly dried they are put into sacks and suspended in a dry, airy place. Sometimes before the mushrooms are sliced they are plunged into boiling water for an instant, which treatment is said to preserve them from the ravages of insects. Several kinds of mushrooms are preserved in the following manner: After they have been properly washed and cleansed, they are boiled in salted water and afterwards wiped dry. They are then placed in layers, in jars, sprinkled with salt and pepper, and covered with pure olive oil or vinegar. *Lactarius deliciosus*, *Cantharellus cibarius*, *Morchellas*, *Clavarias*, etc., are thus preserved. Before using the dried mushrooms they are soaked in tepid water for some time and afterwards prepared as if fresh, with the usual seasoning.

DISTINGUISHING THE EDIBLE SPECIES.

Up to the present time, according to one European authority of recent date, it has been impossible to establish fixed and certain rules for distinguishing edible species of mushrooms from those that are poison-

ous. In general, all those should be regarded as suspicious whose flesh changes to a blue or greenish color on contact with the air, as should also those having a disagreeable, nauseating, or bad odor, or of which the taste is acrid and biting, or the flesh soft, deliquescent, spongy, hard, or corky. On the contrary, the flesh of edible mushrooms is usually firm, but tender, exhaling an odor of freshly ground meal. The aromatic principle which these mushrooms possess in the fresh condition disappears in part by drying them. But these characteristics alone should never serve as a guide for distinguishing edible mushrooms. Other generic and specific features of the plant must be taken into account if we would avoid errors.

PRESERVING AND COOKING MUSHROOMS.

In Europe several species of mushrooms are preserved by boiling and afterwards placing them in earthen jars or tubs filled with water, which is renewed from time to time. This simple and economical method of keeping mushrooms affords the people considerable provision. As to methods of preparing fresh mushrooms for table use, we confine ourselves to a few general directions borrowed from the excellent work of Dr. Roques:

Each country has its processes or special methods, but there are some which are more or less suitable according to the species of mushroom to be eaten. These plants are generally of a compact nature, requiring prolonged digestion. After selecting good mushrooms remove the skin or epidermis, cutting away the hymenium (gills) and in some cases the stem, which is usually of not so fine a texture. They are then allowed to soak for a time in cold or tepid water with the addition of a small quantity of salt and vinegar. After they have been carefully wiped, they are cooked simply on the gridiron and served with butter, pepper, and salt. This is the easiest and most economical method of preparing them. The flavor of the mushroom may be heightened by the addition of olive oil, fine herbs, a pinch of garlic, and some citron juice. This seasoning, much favored in the provinces of southern Europe, renders the mushrooms more healthful and more easily digested. According to species, mushrooms may be prepared with cream, in a fricassee of chicken or a matelote (dish of many kinds of fish), or in pies, soup, fritters, etc. After seasoning them in this case with pepper and salt as usual, they are rubbed in fresh butter and basted from time to time with citron juice, Madeira wine, or other white wine of good quality. Prepared in this way the "true orange" (*Amanita cæsarea*) and the "Cepe" (*Boletus edulis*) are delicious dishes.

Mushrooms should not be gathered during a rainy spell if desired for drying purposes, since their consequent state of humidity hastens their decomposition. It is important to select for use only young and well-preserved specimens, because a mushroom of excellent quality may, nevertheless, when overmature or near its decline, become dangerous for food. It then acts as every other food substance which incipient decomposition has rendered acrid, irritating, and indigestible. It is, moreover, rarely the case that mushrooms in their decline are not changed by the presence of larvæ. (Roques, Hist. des Champignons.)

RECIPES.

The following recipes may prove useful to those not familiar with methods of cooking mushrooms.

Broiled procerus.—Remove the scales and stalks from the agarics and broil lightly on both sides over a clear fire for a few minutes; arrange them on a dish over freshly made, well-buttered toast; sprinkle with pepper and salt and put a small piece of butter on each; set before a brisk fire to melt the butter, and serve quickly. Bacon toasted over mushrooms improves the flavor and saves the butter.

Agarics delicately stewed.—Remove the stalks and scales from young, half-grown agarics, and throw each one as you do so into a basin of fresh water slightly acidulated with the juice of a lemon or a little good vinegar. When all are prepared remove them from the water and put them in a stewpan with a very small piece of fresh butter. Sprinkle with pepper and salt and add a little lemon juice; cover up closely and stew for half an hour; then add a spoonful of flour with sufficient cream, or cream and milk, till the whole has the thickness of cream. Season to taste and stew again until the agarics are perfectly tender. Remove all the butter from the surface and serve in a hot dish garnished with slices of lemon. A little mace or nutmeg or catsup may be added, but some think that spice spoils the flavor.

Cottager's procerus pie.—Cut fresh agarics in small pieces; pepper, salt, and place them on small shreds of bacon, in the bottom of a pie dish; then put in a layer of mashed potatoes, and so fill the dish, layer by layer, with a cover of mashed potatoes for the crust. Bake well for half an hour and brown before a quick fire.

À la provençale.—Steep for two hours in some salt, pepper, and a little garlic; then toss them in a small stewpan over a brisk fire with parsley chopped and a little lemon juice. (Dr. Badham).

Agaric catsup.—Place the agarics of as large a size as you can procure, layer by layer, in a deep pan, sprinkling each layer as it is put in with a little salt. Then next day stir them well several times so as to mash and extract their juice. On the third day strain off the liquor, measure and boil for ten minutes, and then to every pint of liquor add half an ounce of black pepper, a quarter of an ounce of bruised ginger root, a blade of mace, a clove or two, and a teaspoonful of mustard seed. Boil again for half an hour; put in two or three bay leaves and set aside till quite cold. Pass through a strainer and bottle; cork well and dip the ends in resin. A very little Chile vinegar is an improvement and some add a glass of port wine or a glass of strong ale to every bottle. Care should be taken that the spice is not so abundant as to overpower the true flavor of the agaric. A careful cook will keep back a little of the simple boiled liquor to guard against this danger.

To stew mushrooms.—Trim and rub clean half a pint of large button mushrooms. Put into a stewpan 2 ounces of butter; shake it over a fire until thoroughly melted; put in the mushrooms, a teaspoonful of salt, half as much pepper, and a blade of mace pounded; stew until the mushrooms are tender, then serve on a hot dish. This is usually a breakfast dish.

Mushrooms à la crème.—Trim and rub half a pint of button mushrooms; dissolve in a stewpan 2 ounces of butter rolled in flour; put in the mushrooms, a bunch of parsley, a teaspoonful of salt, half a teaspoonful each of white pepper and of powdered sugar; shake the pan for ten minutes; then beat up the yolks of two eggs with two tablespoonfuls of cream, and add by degrees to the mushrooms; in two or three minutes you can serve them in sauce.

Mushrooms on toast.—Put a pint of mushrooms into a stewpan with 2 ounces of butter rolled in flour; add a teaspoonful of salt, half a teaspoonful of white pepper, a blade of powdered mace, and half a teaspoonful of grated lemon; stew until the butter is all absorbed; then serve on toast, as soon as the mushrooms are tender.

To pot mushrooms.—The small open mushrooms suit best for potting. Trim and rub them; put into a stewpan a quart of mushrooms, 3 ounces of butter, two teaspoonfuls of salt, and half a teaspoonful of cayenne and mace mixed, and stew for ten or fifteen minutes or till the mushrooms are tender; take them carefully out and drain them perfectly on a sloping dish and when cold press them into small pots and pour clarified butter over them, in which state they will keep for a week or two. Writing paper over the butter and over that melted suet will effectually preserve them for weeks if in a dry, cool place.

To pickle mushrooms.—Select a number of small sound pasture mushrooms as nearly alike as possible in size. Throw them for a few minutes into cold water, then drain them, cut off the stalks and gently rub off the outer skin with a moist flannel dipped in salt; then boil the vinegar, adding to each quart 2 ounces of salt, half a nutmeg grated, a dram of mace, and an ounce of white pepper corns. Put the mushrooms into the vinegar for ten minutes over the fire; then pour the whole into small jars, taking care that the spices are equally divided; let them stand a day; then cover them.

Baked mushrooms.—Peel the tops of twenty mushrooms; cut off a portion of the stalks and wipe them carefully with a piece of flannel dipped in salt. Lay the mushrooms in a tin dish, put a small piece of butter on the top of each, and season with pepper and salt. Set the dish in the oven and bake them from twenty minutes to half an hour. When done arrange them high in the center of a very hot dish, pour the sauce around them, and serve quickly and as hot as you possibly can.

Mushrooms with bacon.—Take some full-grown mushrooms and having cleaned them procure a few rashers of nice streaky bacon and fry it in the usual manner. When nearly done add a dozen or so of mushrooms

and fry them slowly until they are cooked. In this process they will absorb all the fat of the bacon, and with the addition of a little salt and pepper will form a most appetizing breakfast relish.

Mushrooms en ragout.—Put into a stewpan a little “stock,” a small quantity of vinegar, parsley, and green onions chopped up, salt and spices. When this is about to boil, the cleaned mushrooms are put in. When done remove them from the fire and thicken with yolks of eggs.

CULTIVATION OF MUSHROOMS IN JAPAN.

The Japanese are very successful in cultivating a mushroom which they call “Shiitake” or “*Lepiota shiitake*.” China also produces the same mushroom but of an inferior quality. The Chinese therefore prefer the mushroom cultivated by the Japanese, which they import from Japan in large quantities. It is cultivated on a variety of trees, but is said to grow best on the “Shiinoki,” a species of oak (*Quercus cuspidata*).

There are three varieties of “Shiitake,” the spring, summer, and autumn crops, differing somewhat in quality. The method of growing the “Shiitake” is given by the Japanese Commissioner of Agriculture, as follows :

Trees of from twenty to fifty years growth are cut down at the approach of winter when the sap has ceased to run, and after the lapse of twenty or thirty days, according to the condition of the drying of the wood, are sawed into logs 4 or 5 feet in length. Into each of these logs incisions are made with a hatchet, at intervals of about 6 inches, and they are piled regularly upon a framework erected at a height of about 1 foot above the ground, under the trees. The location of the ground selected for piling the logs should be the slopes of a forest, facing southeast or southwest. After keeping the logs as above described for from two to three years, they are immersed in water for twenty-four hours in the middle of November, and again laid one upon another for about four days; if it is a cold district, the pile is covered with straw or mats. At the expiration of the fourth day the logs are obliquely tilted against poles fixed horizontally to the trees at a height of about 4 feet in a well ventilated and sunny situation. The mushrooms soon appear in quantity, and, after twenty or thirty days’ growth, are ready for harvesting.

Recent reports of the Japanese Agricultural Department show the total value of the annual export of “Shiitake” to be nearly five hundred thousand “yen” (silver). The value of a silver “yen” is 73 cents.

[Extract from a letter of a correspondent in Virginia.]

* * * I learned so much from your “Twelve Edible Mushrooms” that I wish to express my gratitude for the book and for the clear and distinct instructions you have put in it. I brought my little book down here this fall where people knew of only one edible mushroom. By your aid we discovered others, especially the Giant Puff-ball, which we gathered in great quantities and prepared in more than one fashion for the table, making an excellent addition to the somewhat limited bill of fare found in a country district.

EDIBLE MUSHROOMS OF THE UNITED STATES.

I. HYMENOMYCETES.

AGARICUS, Linnæus.

AMANITA, Fries.

 Cæsareus, Fries.

 Circinatus, Schumacher.

 rubescens, Persoon.

 strobiliformis, Vittadini.

 vaginatus, Bulliard.

LEPIOTA, Fries.

 cepastipes, Sowerby.

 var. cretaceus, Peck.

 excoriatus, Schaeffer.

 farinosus, Peck.

 mastoides, Fries.

 naucinoides, Peck.

 procerns, Scopoli.

 rachodes, Vittadini.

ARMILLARIA, Fries.

 melleus, Vahl.

TRICHOLOMA, Fries.

 albellus, De Candolle.

 castus, Curtis.

 Columbetta, Fries.

 consociatus, Curtis.

 frumentaceus, Bulliard.

 gambosus, Fries.

 hypopithus, Curtis.

 imbricatus, Fries.

 nudus, Bulliard.

 personatus, Fries.

 transmutans, Peck.

 Russula, Schaeffer.

 vaccinus, Persoon.

CLITOCYBE, Fries.

 cespitosus, Curtis.

 cyathiformis, Bulliard.

 dealbatus, Fries.

 fragrans, Sowerby.

 geotropus, Bulliard.

 gigantens, Sowerby.

 gilvus, Persoon.

 infundibuliformis, Schaeffer.

 media, Peck.

 nebularis, Batsch.

 odorus, Bulliard.

COLLYBIA, Fries.

 esculentus, Jacquin.

 radicatus, Relhan.

PLEUROTUS, Fries.

 dryinus, Persoon.

 glandulosus, Fries.

 ostreatus, Bulliard.

 petaloides, Bulliard.

 Pometi, Fries.

 salignus, Persoon.

 sapidus, Kalchbrenner.

 tessulatus, Bulliard.

 ulmarius, Bulliard.

VOLVARIA, Fries.

 bombycinus, Schaeffer.

ENTOLOMA, Fries.

 frumentaceus, Bulliard.

CLITOPILUS, Fries.

 abortivus, Berkeley and Curtis.

 orecella, Bulliard.

 prunulus, Scopoli.

PHOLIOTA, Fries.

 mutabilis, Schaeffer.

 præcox, Persoon.

 squarrosus, Müller.

PSALLIOTA, Fries.

 amygdalinus, Curtis.

 arvensis, Schaeffer.

 campestris, Linnæus.

 Rodmani, Peck.

 silvicola, Vittadini.

 squamosus, Fries.

HYPHOLOMA, Fries.

 sublateritius, Fries.

COPRINUS, Fries.

 atramentarius, Bulliard.

 comatus, Fries.

CORTINARIUS, Fries.

 (Dermocybe) cinnamomeus, Fries.

 (Hygrocybe) castaneus, Fries.

 (Inoloma) violaceus, Fries.

 (Phlegmacium) cærulescens, Fries.

 (Phlegmacium) turmalis, Fries.

 (Telamonia) armillatus, Fries.

PAXILLUS.

involutus, Fries.

HYGROPHORUS, Fries.

eburneus, Bulliard.

miniatus, Fries.

pratensis, Persoon.

virgineus, Fries.

LACTARIUS, Fries.

deliciosus, Fries.

insulsus, Fries.

piperatus, Fries.

subdulcis, Bulliard,

volemus, Fries.

RUSSULA, Fries.

alutacea, Fries.

heterophylla, Fries.

lepida, Fries.

rubra, De Candolle.

virescens, Schaeffer.

CANTHARELLUS, Fries.

cibarius, Fries.

MARASMIUS, Fries.

alliaceus, Jacquin.

oreades, Bolton.

scorodonius, Fries.

PANUS, Fries.

conchatus, Fries.

torulosus, Persoon.

BOLETUS, Fries.

badius, Fries.

bovinus, Linnæus.

castaneus, Bulliard.

Clintonianus, Peck.

collinitus, Fries.

edulis, Bulliard.

elegans, Bulliard.

flavidus, Fries.

granulatus, Linnæus.

luteus, Linnæus.

scaber, Fries.

subluteus, Peck.

subtomentosus, Linnæus.

versipellis, Fries.

POLYPORUS, Fries.

Berkeleyi, Fries.

confluens, Albertini and Schweinitz.

cristatus, Persoon.

frondosus, Fries.

giganteus, Persoon.

POLYPOROUS, Fries—Continued.

leucomelas, Persoon.

ovinus, Schaeffer.

picipes, Fries.

poripes, Fries.

squamosus, Hudson.

sulfureus, Bulliard.

FISTULINA, Bulliard.

hepatica, Hudson.

HYDNUM, Linnæus.

auriscalpium, Linnæus.

caput-Medusæ, Bulliard.

coralloides, Scopoli.

erinaceum, Bulliard.

imbricatum, Linnæus.

lævigatum, Sowerby.

repandum, Linnæus.

rufescens, Persoon.

subsquamosum, Batsch.

CRATERELLUS, Fries.

cornucopioides, Linnæus.

SPARASSIS, Fries.

crispa, Fries.

laminosa, Fries.

CLAVARIA, Linnæus.

amethystina, Bulliard.

aurea, Schaeffer.

botrytis, Persoon.

cinerca, Bulliard.

cristata, Persoon.

fastigiata, Linnæus.

flava, Schaeffer.

formosa, Persoon.

fuliginea, Persoon.

grisea, Persoon.

macropus, Persoon.

muscoides, Linnæus.

pistillaris, Linnæus.

pyxidata, Persoon.

rugosa, Bulliard.

subtilis, Persoon.

tetragona, Schweinitz.

vermiculata, Scopoli.

TREMELLA, Fries.

lutescens, Persoon.

mesenterica, Retz.

HIRNEOLA, Fries.

auricula-Judæ, Linnæus

II. GASTEROMYCETES.

BOVISTA, Dillenius.

nigrescens, Persoon.

plumbea, Persoon.

LYCOPERDON, Tournefort.

cælatum, Bulliard.

LYCOPERDON—Continued.

cyathiforme, Bosc.

giganteum, Batsch.

saccatum, Fries.

Wrightii, Berkeley and Curtis.

III. ASCOMYCETES.

MORCHELLA, Dillenius.

angusticeps, Peck.

bispora, Sowerby.

Caroliniana, Bosc.

deliciosa, Fries.

esculenta, Persoon.

semilibera, De Candolle.

HELVELLA, Linnæus.

crispa, Fries.

elastica, Bulliard.

esculenta, Linnæus.

infula, Schaeffer.

laeunosa, Afzelius.

sulcata, Afzelius.

VERPA, Swartz.

digitaliformis, Persoon.

LEOTIA, Hill.

lubrica, Persoon.

PEZIZA, Linnæus.

acetabulum, Linnæus.

aurantia, Fries.

badia, Persoon.

cochleata, Hudson.

macropus, Persoon.

onotica, Persoon.

vesiculosa, Bulliard.

BULGARIA, Fries.

inquinans, Fries.

